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### STATUS OF THE NIGHT HERONS (*NYCTICORAX*) OF THE PHILIPPINES AND VICINITY

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Two species of *Nycticorax* occur in the Philippines, the Black-crowned Night Heron (*N. nycticorax*) and the Rufous Night Heron (*N. caledonicus*). DuPont (1971) regards the latter as a widespread breeding bird of these islands, whereas he implies that *N. nycticorax* is only a winter visitant from Asia—recorded on Luzon, Calayan, and Mindanao. These two closely related (Bock, 1956) herons are largely allopatric, with contact or overlap known only in the Celebes (White, 1973) and in Java (Hoogerwerf, 1966). In at least the latter area, interbreeding has been reported (Hoogerwerf, 1966). Recently, specimens have been received at the Delaware Museum of Natural History (DMNH) that indicate that *N. nycticorax* occurs in summer on Luzon with *N. caledonicus*; among the adult specimens taken, there is one that I regard as a probable hybrid between the two species. I propose to discuss this situation and related aspects, including an assessment of the two races of *N. caledonicus* that have been described from the Philippines; i.e., *N. c. manillensis* Vigors and *N. c. major* Hachisuka.

#### DESCRIPTION AND RANGES OF THE TWO SPECIES

The Black-crowned Night Heron and the Rufous Night Heron are basically similar in morphology and, as far as I can determine, habits. *N. n. nycticorax* is a familiar species in Eurasia and Africa, with the upperparts, underwings, cheeks, neck, sides, wings, and tail various shades of gray; the crown and back black; and the remaining underparts, forehead, superciliary, and nuptial plumes white. In *N. caledonicus*, the upperparts (including the back), neck, wings, and tail are rufous to brown. The underwings are rufous variously mixed with white, the crown and the forehead black, and the nuptial plumes white to blackish. The underparts are white, and (depending on the race) the superciliary, sides, and thighs are white to rufous, the latter being the color of these parts in Philippine birds.

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At present, *N. nycticorax* is known to breed in Asia southward to Java (Hoogerwerf, 1966, etc.) and Borneo (Smythies, 1960); in the summer of 1867 at least, it also occurred in the Celebes (White, 1973) and may have bred there. *N. caledonicus* occurs northward in the region to Luzon and apparently eastern Java (Hoogerwerf, 1966), as well as casually to Borneo (Smythies, 1960).

The assessment of the status of *N. nycticorax* is complicated by the fact that the species occurs southward as a migrant from eastern Eurasia, at least in the Philippines. For example, several birds banded in the breeding season in Japan have been recovered in winter or migration on Luzon (Austin and Kuroda, 1953; McClure, 1966, 1967). To date, there seem to be no Asian (Malaya, Taiwan, Japan) birds recovered in such areas as Borneo, Sumatra, or Java; and this may mean that under ordinary circumstances the migration touches only the Philippines. On the other hand, presumable migrants of this species have been taken in the Caroline Islands (Palau, Ponape—both USNM), which suggests that the species can be expected farther west and south as well. At any rate, the fact that migrants of *N. nycticorax* reach the northern part of the range of *N. caledonicus* means that caution must be used in any statements regarding sympatry between the two species.

#### RANGES AND STATUS OF THE SPECIES IN THE PHILIPPINES

*N. caledonicus* certainly occurs throughout the Philippines. I have seen specimens from Luzon, Marinduque, Mindoro, Negros, Panay, Siquijor, Palawan, Mindanao, and the Sulu Archipelago (Sibutu, Siassi, and Tawi Tawi Islands). In addition, there are various literature citations of specimens from Cebu, Dumiguete, Basilan, and Samar. In spite of the widespread distribution of the species, little precise information has been published on breeding. McGregor (1909) lists eggs from Siquijor in February and May, and I have seen young juveniles as follows: Siassi, November 1895 (ANSP); Siquijor, 26 February 1888 (USNM); and Palawan, March 1971 (DMNH).

I have examined *N. nycticorax* specimens only from Luzon, with dates from 22 January to 18 March and in June—the latter being the birds in the recent DMNH series (3 adults, 1 subadult, and 1 immature). McGregor (1904) took one or possibly two specimens on Calayan in the period September to November 1903, and in his most inclusive work on the birds of the Philippines (McGregor, 1909), he reported the species from Mindanao, Calayan, and Luzon. Sharpe (1898) also listed specimens in the British Museum from Luzon, but he gave no dates. Finally, Melvin Traylor (*in litt.*) has informed me of an immature from Mindanao (FMNH), taken on 17 October 1968.

The recent DMNH series of *Nycticorax* (both species) from the Philippines, taken in June 1973, consists of 12 specimens from Balian, Pangil, on Laguna Bay, in Laguna Province, Luzon. According to notes supplied by the collectors, that area is semiswampland, with mangrove-like trees and reeds inter-

persed with rice fields. Night herons were said to be breeding there in June 1973, with nests placed in the lower trees and containing an average of four light blue eggs. The implication is that both *N. nycticorax* and *N. caledonicus* were nesting at the site.

The size of the gonads (illustrated on the labels) in adult specimens would seem consistent with the information supplied by the collectors; the birds may have been in the incubation phase of breeding, as the gonads appear in regressed stage. The *N. nycticorax* gonads measure as follows: male, testes  $3.5 \times 7$  mm; females (2), ovaries  $9 \times 2$  and  $7 \times 2$ . The *N. caledonicus* measure: male, testes  $6 \times 11$ ; females (3), ovaries  $8 \times 2.5$ ,  $8 \times 2.5$ , and  $9 \times 2$  mm. On the other hand, the putative hybrid had testes too large to illustrate on the label, and the measurements were written by the collector as  $10 \times 23$  mm.

From the preceding evidence, I believe that both species of *Nycticorax* were indeed nesting when this series was taken. Certainly, migrant *N. nycticorax* from Asia should be absent from Luzon in June, judging from the dates of occurrence of the species in areas such as Japan (Austin and Kuroda, 1953). Furthermore, judging from the fact that the putative hybrid is an adult, I would assume that these two species of *Nycticorax* bred together at Balian not only in 1973, but probably for some years previously. According to Palmer (1962), the adult plumage of *N. nycticorax* is not attained until the age of three years, and this could also apply to *N. caledonicus*. Consequently, sympatry of the two species is judged to have occurred for at least several years, if not longer.

#### GEOGRAPHIC VARIATION OF *N. caledonicus* IN THE PHILIPPINES

The name *N. c. manillensis* Vigors has been applied generally to birds from throughout the Philippine Islands. However, Hachisuka (1926) introduced another name in describing *N. c. major* from Zamboanga, Mindanao. He distinguished his new race as being larger than *manillensis* and in having the base of the mandible pale, rather than black. In his series of 15 specimens, from unspecified Philippine localities, he stated that *major* exceeded *manillensis* by 24 mm in wing length, 9 mm in tail length, and 3 mm in tarsus length. The type of *major*, an adult male, was said to measure 336, 130, and 90 mm in these characters, plus 73 mm in bill length (presumably exposed culmen).

In my analysis of 42 adult and subadult (presumably two-year-old birds) specimens of *N. caledonicus* from the Philippines, I find that southern populations do average consistently larger than northern ones (Table 1). Eighteen specimens from Luzon, Marinduque, and Mindoro have the wings and tarsi of males and the tails and tarsi of females significantly shorter than those of 19 specimens from Mindanao and the Sulu Archipelago (Mann-Whitney U test,  $P < .5$ , H:  $\bar{x}_1 = \bar{x}_2$ ). The remaining measurements are also generally smaller (not significantly so) in the northern population; however, in culmen length

Table 1: Measurements (in mm) of Adult and Subadult *Nycticorax* from the Philippines (*N. caledonicus* and Putative Hybrid) and the Philippines and vicinity<sup>1</sup> (*N. nycticorax*)

|                          | Wing (arc) |             |             | Tail     |             |             | Culmen <sup>2</sup> |             |             | Tarsus   |             |             |
|--------------------------|------------|-------------|-------------|----------|-------------|-------------|---------------------|-------------|-------------|----------|-------------|-------------|
|                          | <i>N</i>   | <i>Mean</i> | <i>S.D.</i> | <i>N</i> | <i>Mean</i> | <i>S.D.</i> | <i>N</i>            | <i>Mean</i> | <i>S.D.</i> | <i>N</i> | <i>Mean</i> | <i>S.D.</i> |
| Males                    |            |             |             |          |             |             |                     |             |             |          |             |             |
| <i>N. c. major</i>       | 12         | 329.7       | 11.6        | 10       | 110.5       | 5.2         | 10                  | 74.0        | 3.4         | 10       | 88.0        | 4.1         |
| <i>N. c. manillensis</i> | 5          | 305.0       | 9.3         | 5        | 105.9       | 3.7         | 6                   | 70.7        | 2.3         | 6        | 81.0        | 4.7         |
| Hybrid                   | 1          | 298.0       | —           | 1        | 104.0       | —           | 1                   | 79.5        | —           | 1        | 83.5        | —           |
| <i>N. n. nycticorax</i>  | 3          | 281.3       | —           | 3        | 95.7        | —           | 3                   | 72.0        | —           | 3        | 76.0        | —           |
| Females                  |            |             |             |          |             |             |                     |             |             |          |             |             |
| <i>N. c. major</i>       | 7          | 311.0       | 12.8        | 7        | 108.4       | 5.0         | 6                   | 70.2        | 2.7         | 7        | 85.4        | 2.9         |
| <i>N. c. manillensis</i> | 10         | 299.3       | 7.4         | 8        | 100.6       | 2.2         | 9                   | 70.9        | 1.6         | 9        | 81.9        | 1.5         |
| <i>N. c. nycticorax</i>  | 7          | 280.7       | 9.5         | 6        | 92.3        | 7.1         | 6                   | 69.2        | 3.7         | 6        | 73.0        | 1.8         |

<sup>1</sup> Specimens from Philippines, Java, and Borneo

<sup>2</sup> Exposed

of females, the means are similar in the two samples. Specimens from intervening areas are few, but four from Negros are generally long-winged: female 318; males 308, 330, 321 (female and first two males were measured by M Traylor); a male from Samar (wing 319) was measured by Rand and Rabor (1960). On the other hand, a single male from Panay is small (wing 307).

Based on my assessment of mensural data, I would accept *major* as a valid race and extend its range from the Sulu Archipelago and Mindanao northward to include Negros and probably Samar; *manillensis* includes the birds of Luzon, Mindoro, and probably Panay. In addition, I would assign two specimens from Labuan Island, North Borneo (AMNH) to *manillensis*: unsexed adult [♂?] with the short tarsus length of 77.5 mm (wing 312.0, tail 105.0, culmen 77.5 mm); immature ♂, also with the tarsus short, at 76.5 mm (wing 309.0, tail 102.5, culmen 69.5 mm). I have not seen grown specimens from Palawan, but judging from those of Borneo, *H. c. manillensis* may well be the race that occurs there.

While overlap exists between *manillensis* and *major*, in combination the measurements allow the proper identification of virtually all examined Philippine adult and subadult specimens to one race or the other. I suspect that in some cases birds have been mis-sexed, with the result that part of the mensural overlap is more apparent than real. Full-grown immatures (one year old or less) average somewhat smaller than adults and subadults, but in general they show parallel trends in variation to them; however, immatures may be

more often mis-sexed than older birds, which would undermine their value in assessing geographic variation. In general, I find the following mensural distinctions apply to the two races (adults and subadults):

**Males**

|  |                    |
|--|--------------------|
| Wing 312 mm or less, tail 108 or less, tarsus 81.0 or less | <i>manillensis</i> |
| Wing 314 mm or more, tail 109 or more, tarsus 82.0 or more | <i>major</i>       |

**Females**

|  |                    |
|--|--------------------|
| Wing 310 mm or more, tail 102.5 or more, tarsus 83.5 or less | <i>manillensis</i> |
| Wing 303 mm or more, tail 102.5 or more, tarsus 84.0 or more | <i>major</i>       |

Regarding the supposed black (*manillensis*) versus pale base of the mandible (*major*)—said by Hachisuka (1926) to prevail in all populations of the species except those of the northern Philippines—I find this is indeed the trend, but much overlap exists. For example, in ten 1966 and 1971 adults of *major*, three have black and seven have light bases to the mandible; in five 1958 and 1972 *manillensis*, three have black and two have pale bases. The use of this character may be complicated by the age of a bird and the length of time a specimen has been in a collection. Thus, young *N. caledonicus* have more pale coloration in the bill than adults, and this possibly persists through the earliest assumption of adult plumage. Also, birds collected early in this century seem to have the base of the mandible black with a greater frequency than in more recently taken specimens. For example, four such *manillensis* specimens have the base of the mandible black, as do three *major*—including one subadult. From the above findings, I would regard bill color as a variable character and of no or very limited value in segregating these two races.

### THE PUTATIVE HYBRID FROM LUZON

The Philippine specimen (DMNH 19404) that I regard as a hybrid between *N. nycticorax* and *N. caledonicus* was collected in June 1973 in Laguna Province, as already stated. The bird is in adult plumage and more closely resembles *caledonicus* than *nycticorax*. It differs from the former in several respects (Table 2), including having a pale forehead, browner (less rufous) upperparts, and whiter nuptial plumes and underparts, as well as having the rufous chest band broken medially by white. The increased white in the plumage is thought to be a reflection of *nycticorax* "genes," and the grays in that species' plumage (versus rufous in *caledonicus*) may also account for the brownness in the hybrid. In wing and tail measurements, the supposed hybrid is closer to *N. c. manillensis* than to the smaller *N. n. nycticorax* (Table 1). The hybrid also agrees more closely in exposed culmen and tarsus length with *N. caledonicus*, but it is larger in these characters than specimens of *manillensis* and instead overlaps with *major*. None of the Philippine specimens of *N. n. nycticorax* approaches the hybrid in size (or in other characters), nor is there an approach in the meas-

Table 2: Plumage Comparisons of Adult *Nycticorax nycticorax*, *N. caledonicus*, and a Putative Hybrid of the Two from the Philippines

| Characters                  | <i>N. caledonicus</i> <sup>1</sup><br>(Philippines)    | Putative hybrid<br>(Luzon)    | <i>N. nycticorax</i> <sup>2</sup><br>(Asia) |
|-----------------------------|--|-------------------------------|---|
| Nuptial plumes              | brown to whitish                                       | white with slight brown wash  | white                                       |
| Superciliary                | light rufous to black                                  | buff                          | white                                       |
| Forehead (anterior)         | black  | grayish buff                  | white                                       |
| Cheeks and auriculars       | buff to light rufous                                   | light grayish brown to buff   | white to gray                               |
| Throat                      | white to buff  | white                         | white                                       |
| Nape                        | rufous, with dark brown to black tips                  | light brown                   | light gray                                  |
| Chest sides                 | shades of rufous                                       | light rufous                  | gray  |
| middle                      | shades of rufous                                       | white with light rufous tips  | white                                       |
| Sides                       | white to light rufous                                  | white with slight rufous      | gray  |
| Thighs                      | light rufous   | white with slight buff        | white                                       |
| Back                        | reddish brown, darkest and least reddish in upper area | light brown with grayish cast | bluish black with greenish iridescence      |
| Wings and tail              | rufous   | light (beige) brown           | gray  |
| Axillars, underwing coverts | light rufous and white                                 | white with slight buff        | white and light gray                        |

<sup>1</sup>*N. c. manillensis* and *N. c. major*

<sup>2</sup>*N. n. nycticorax*

urements published for this form from elsewhere (e.g., Witherby, 1947). In sum, the putative hybrid from Luzon agrees more closely with *N. caledonicus*, but in some respects of the plumage it shows the apparent influence of *N. nycticorax*.

From greater resemblance of the hybrid in size and plumage to *N. caledonicus*, I suspect that it may be a backcross rather than an F<sub>1</sub> of these two species.

In addition, the four adult *N. caledonicus* taken with the hybrid also show certain departures from specimens of the species taken elsewhere in the Philippines; i.e., they have somewhat more brownish upperparts and the nuptial plumes are white. I am uncertain as to the significance of these departures, but it is conceivable that they may reflect the presence of *N. nycticorax* genes in these birds. The three adult *N. nycticorax* collected with the hybrid appear typical of their species.

In view of the variability within *N. caledonicus* (Amadon, 1942), it is appropriate to consider the possibility that the supposed hybrid might be either a vagrant of another race of the species or possibly a mutant. In the first regard, I find that there is a certain similarity between the putative hybrid and specimens of *N. c. pelewensis* Mathews (Caroline Islands). That race is duller than *manillensis* and *major*, has the rufous breast band interrupted by white, and often has white nuptial plumes. However, my comparisons show that the supposed hybrid is even browner than *pelewensis*, with less rufous on the wings and tail, much darker and browner back, browner cheeks, brighter and more rufous breast, and whiter underwing surfaces. Also, the hybrid has a pale area on the forehead, a feature not seen in any other specimen except one Australian example of *N. c. hilli* (Mathews). I am convinced that the Luzon bird is not *N. c. pelewensis* nor any other race of the species, and I am unaware of any known mutant that resembles it.

#### HYBRIDIZATION ELSEWHERE BETWEEN THE TWO SPECIES

The other hybrids described between *N. nycticorax* and *N. caledonicus* are from western Java, where Hoogerwerf (1966) has reported occasional individuals of the latter species breeding among the abundant *N. nycticorax*. His description of an apparent subadult hybrid is based on a bird raised in captivity. Compared to an individual of *N. nycticorax* of about the same age, Hoogerwerf describes the presumed hybrid as having the wings duller bluish gray, washed with a reddish coloration that extends over the sides of the neck and breast; the back was said to be only a trifle darker than the wings, while the neck and crown were darker than in *N. caledonicus*. Hoogerwerf also collected an adult female *N. caledonicus* from the colony from which the presumed hybrid came. The specimen was compared by him to specimens of *N. c. hilli* and found to differ as follows: the white underparts were considerably less washed with buffy brown, especially on the cheeks, foreneck, and chest; there was a distinct white frontal area connected to the white superciliaries; and the mantle and scapulars were distinctly darker. The nuptial plumes were said to be white with dark tips, and the wings measured 264 and 269 mm.

Without having seen either of Hoogerwerf's specimens, it is difficult to judge them relative to the putative Philippine hybrid. However, the description of his

subadult hybrid seems to place the bird closer to *N. nycticorax*, which might indicate that it is a backcross between that species and a more intermediate (e.g.,  $F_1$ ) hybrid.

The view of possible backcrossing is strengthened if one considers his specimens of *N. caledonicus* actually to be a hybrid; leading me to this view are such characteristics as the specimen's reduction in rufous below, darker upperparts, and the presence of a white frontal region. The specimen is also shorter winged than typical *N. c. hilli* (Amadon, 1942), the race one would expect in Java; on the other hand, the specimen agrees more with *N. nycticorax* in this character.

Hoogerwerf (1966) also describes an oddly plumaged adult male *N. caledonicus* from the Celebes, and I regard it, too, as a possible hybrid. He described that specimen as differing from *N. c. hilli* in having a partly gray tint to the primaries, back, and tail; in being paler on the remainder of the wings and lower mantle; and in having a light frontal area. The wing length of 286 mm is also small for *hilli* (Amadon, 1942). Hoogerwerf (1966) also raises the possibility that the two adult *N. caledonicus* that he describes are actually hybrids; however, he goes on to state that he does not believe them to be, as they do not closely resemble the subadult, known hybrid that he described. If backcrossing is a factor, however, it could produce a spectrum of hybrid types; thus, Hoogerwerf's two adults could indeed be hybrids as well. In fact, I suspect that backcrossing has indeed occurred, and hybridization between the two species may well be more widespread than previously thought, e.g., in Java, the Celebes, and Luzon.

A factor to be kept in mind in assessing the status of these two species, and one alluded to earlier, is the possibility that some of the oddly plumaged birds might represent color or pattern aberrancies. In the American race *N. n. hoactli* (Gmelin), van Rossem (1936) has reported an instance of erythrism in a subadult from California. This bird was normally plumaged, except that the mantle and wing coverts were brown (Hays Russet of Ridgway) instead of black, and the lateral underparts and sides of the chest were tinged with reddish rather than gray. I have seen two adult specimens (USNM), presumed *N. n. nycticorax*, from Enggano Island, off western Sumatra, that also show this type of coloration. One has grayish buff replacing the gray of the cheeks and nape, some buff on the wings and back, and the mantle dull, grayish black. The other is even more extreme, with buff instead of gray cheeks, nape, neck, sides of chest, sides, axillars, and underwings (mixed with white), and on the wings, tail, and rump; the mantle is dark, grayish brown, and the tail is pale and mottled from white to gray and brown. In size both specimens are close to *N. n. nycticorax*, and I agree with Ripley (1944) that they are best considered erythristic examples of this species. However, the possibility that some gene flow from *N. caledonicus* is involved in their ancestry cannot be absolutely ruled out, as Enggano Island is very close to western Java—where hybridiz-



ation is known to occur. Interestingly, these two specimens led Ripley (1944) to speculate that *N. caledonicus* might be a species in which a mutation to erythrism has become dominant in the genotypes, presumably inferring that this species evolved from an *N. nycticorax*-like (i.e., grayish) ancestor.

### SUMMARY

*N. nycticorax* and *N. caledonicus* are closely related species that have been sympatric at one time or another in Java, Celebes, and the Philippines. In each of these areas at least one instance of hybridization seems to have occurred, and backcrossing may have occurred as well. In Luzon, a series of specimens taken in 1973 and field notes of the collectors show both species occurring and probably breeding together in Laguna Province in June. One of 12 specimens appears to be a hybrid between the two species (closer to *N. caledonicus*), and the four adult *caledonicus* in the series are somewhat atypical for the species and could have *nycticorax* genes (the three specimens of the latter species appear typical). Finally, on mensural grounds I recognize the smaller race *H. c. manillensis* Vigors in the northern Philippines (vagrant [?] to Borneo) and the larger *H. c. major* Hachisuka in the south.

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